Innovation Clusters in the Decade of the 1990s
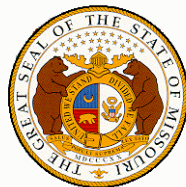
TARGET MISSOURI

TM-0102-2
January 2002

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Innovation Clusters in the Decade of the 1990s

TARGET MISSOURI

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Analysis and reporting by David J. Peters.

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I.   Overview

Innovation is generally considered one of the key components of success in the New Economy. Innovations occurring within an economy usually lead to increased economic output, the creation of more jobs with higher wages, increased investment and increased research and development dollars. Innovation also increases the attractiveness of an area for recruiting new businesses and highly skilled workers.

The notion of firms locating to areas where they can share resources with other similar firms is termed industry clustering, and has been studied extensively by regional economists. These resources are shared products, services and knowledge provided by other industries and institutions. The theory behind industry clusters is that each firm's competitive position in the market depends on one or several supporting industries or institutions. This interdependence between a firm's suppliers and consumers is key to the success of a given industry. Industry cluster analysis views the development of supporting industries as vital to the health and growth of a given industry. Industries can be clustered along labor, knowledge, or inter-industry transactions. Therefore, it is argued that firms and workers generally locate to areas that are innovation centers for a given industry.

To measure the degree of innovation, utility patent data for all 319 metropolitan statistical areas (MSAs) in the United States was compiled and analyzed. Data is taken from the United States Patent and Trademark Office of the U.S. Department of Commerce. For this analysis, utility patents (patents for inventions) granted between 1990 and 1999 were extracted from the TAF database. Patents are classified by technology class and geographic location according to information given in the patent application. Geographic locations were assigned as the physical location of the individual or organization whom is the primary patent holder.

Three measures of innovation were used in this analysis:

(1) *Number of Patents Issued Per 100,000 Population.* This measure removes the effect of population size, and allows for MSA-to-MSA comparisons.

(2) *Innovation Scale.* To compare the number of patents issued per 100,000 population to the national average, the standardized z-scores were calculated for each MSA. Scores of 0.0 indicate innovation at the national average. Scores greater than 0.0 indicate innovation above the national average. Scores less than 0.0 indicate innovation below the national average.

(3) *Innovation Growth Scale.* The difference in the number of patents issued per 100,000 for 1990-94 and 1995-99 was calculated and transformed into standardized z-scores for comparison to the national average. Scores of 0.0 indicate innovation growth at the national average. Scores greater than 0.0 indicate innovation growth above the national average. Scores less than 0.0 indicate innovation growth below the national average.

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II.   Innovation Clusters 1990-1994

In metropolitan areas of the United States between 1990 and 1994, 23.51 patents were issued per 100,000 population. Innovation clusters are those MSAs that have had a well above average (more than 1.0 standard deviation above the national mean) number of patents per 100,000 between 1990 and 1994.

The innovation clusters between 1990 and 1994 were Rochester NY (5.22), San Jose CA (5.03), Trenton NJ (5.1), Wilmington-Newark DE-MD (3.87), Boulder-Longmont CO (3.41), Saginaw-Bay City-Midland MI (3.14), Middlesex-Somerset-Hunterdon NJ (2.83), Dutchess County NY (2.41), Brazoria TX (2.35), Corvallis OR (2.21), Albany-Schenectady-Troy NY (1.89), Boise City ID (1.78), Ann Arbor MI (1.77), Fort Collins-Loveland CO (1.71), Austin-San Marcos TX (1.67), Rochester MN (1.54), Minneapolis-St. Paul MN-WI (1.50), New Haven-Bridgeport-Stamford CT (1.49), Elmira NY (1.37), Santa Fe NM (1.24), Burlington VT (1.21), Newark NJ (1.09), Rockford IL (1.03) and Binghampton NY (1.02).

Map 2.1
Innovation Clusters, 1990-1994
Normed to the U.S. Metropolitan Average of 23.51 patents per 100,000 population
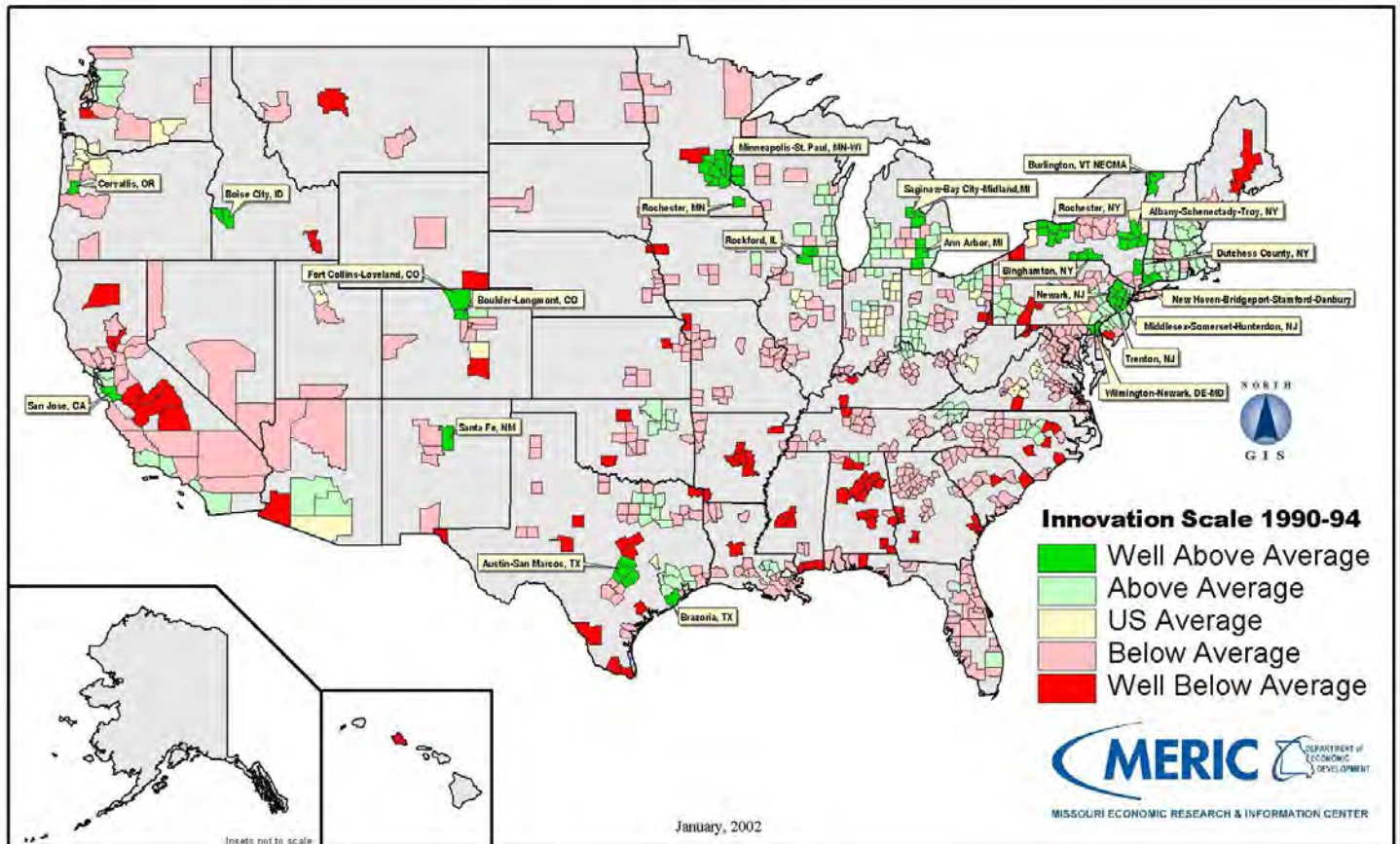
Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

Table 2.1
Innovations Clusters by Metropolitan Area, 1990-1994
Average values for years 1990-1994

METROPOLITAN AREA	INNOVATION SCALE	PATENTS PER 100,000	PATENTS ISSUED
Rochester, NY MSA	5.22	112.37	1,211
San Jose, CA PMSA	5.03	109.13	1,663
Trenton, NJ PMSA	5.01	108.78	356
Wilmington-Newark, DE-MD PMSA	3.87	89.51	473
Boulder-Longmont, CO PMSA	3.41	81.52	194
Saginaw-Bay City-Midland,MI MSA	3.14	76.97	309
Middlesex-Somerset-Hunterdon, NJ PMSA	2.83	71.79	749
Dutchess County, NY PMSA	2.41	64.64	169
Brazoria, TX PMSA	2.35	63.54	129
Corvallis, OR MSA	2.21	61.13	44
Albany-Schenectady-Troy, NY MSA	1.89	55.74	487
Boise City, ID MSA	1.78	53.86	173
Ann Arbor, MI PMSA	1.77	53.67	270
Fort Collins-Loveland, CO MSA	1.71	52.62	105
Austin-San Marcos, TX MSA	1.67	51.92	470
Rochester, MN MSA	1.54	49.83	55
Minneapolis-St. Paul, MN-WI MSA	1.50	49.00	1,283
New Haven-Bridgeport-Stamford, CT PMSA	1.49	48.94	841
Elmira, NY MSA	1.37	46.77	44
Santa Fe, NM MSA	1.24	44.71	55
Burlington, VT NECMA	1.21	44.06	68
Newark, NJ PMSA	1.09	42.09	809
Rockford, IL MSA	1.03	41.11	139
Binghamton, NY MSA	1.02	40.96	108
Orange County, CA PMSA	1.00	40.47	1,004
Boston-Worcester-Lawrence-Lowell, MA PMSA	0.99	40.30	2,254
Pittsfield, MA NECMA	0.98	40.13	35
San Francisco, CA PMSA	0.95	39.70	644
Sheboygan, WI MSA	0.94	39.47	42
Cedar Rapids, IA MSA	0.87	38.38	66
Allentown-Bethlehem-Easton, PA MSA	0.87	38.26	231
Hartford, CT NECMA	0.80	37.18	429
Akron, OH PMSA	0.80	37.15	248
Appleton-Oshkosh-Neenah, WI MSA	0.72	35.71	116
Hamilton-Middletown, OH PMSA	0.69	35.25	108
Ventura, CA PMSA	0.69	35.19	241
Santa Cruz-Watsonville, CA PMSA	0.68	35.03	81
Raleigh-Durham-Chapel Hill, NC MSA	0.65	34.51	315
New London-Norwich, CT NECMA	0.63	34.23	99
Santa Barbara-Santa Maria-Lompoc, CA MSA	0.63	34.19	129
Madison, WI MSA	0.62	34.07	132
Monmouth-Ocean, NJ PMSA	0.61	33.94	343
Detroit, MI PMSA	0.61	33.88	1,468
Gainesville, FL MSA	0.60	33.78	64
San Diego, CA MSA	0.58	33.34	860
Baton Rouge, LA MSA	0.56	33.01	180
Benton Harbor, MI MSA	0.56	32.99	53
Oakland, CA PMSA	0.53	32.54	703
Cincinnati, OH-KY-IN PMSA	0.52	32.36	503
Kokomo, IN MSA	0.52	32.32	32
UNITED STATES METRO TOTAL	**0.00**	**23.51**	**47,926**

Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

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In Missouri, MSAs with the highest number of patents issued per 100,000 population were St. Louis MO-IL (20.25, ranking 107th), Columbia MO (14.90, ranking 141st), Springfield MO (12.89, ranking 160th), Joplin MO (10.44, ranking 187th), Kansas City MO-KS (10.14, ranking 191st) and St. Joseph MO (5.31, ranking 271st). There were 319 MSAs included in this analysis.

All of Missouri's MSAs had below average innovation scores, compared to the national average. In Missouri, MSAs with below average innovation scores were St. Louis MO-IL (-0.19), Columbia MO (-0.51), Springfield MO (-0.62), Joplin MO (-0.77), Kansas City MO-KS (-0.79) and St. Joseph MO (-1.07).

This indicates that Missouri's metropolitan areas were doing poorly in terms of innovation in the first half of the 1990s.

Table 2.2
Innovations by Metropolitan Area in Missouri, 1990-1994
Average values for years 1990-1994

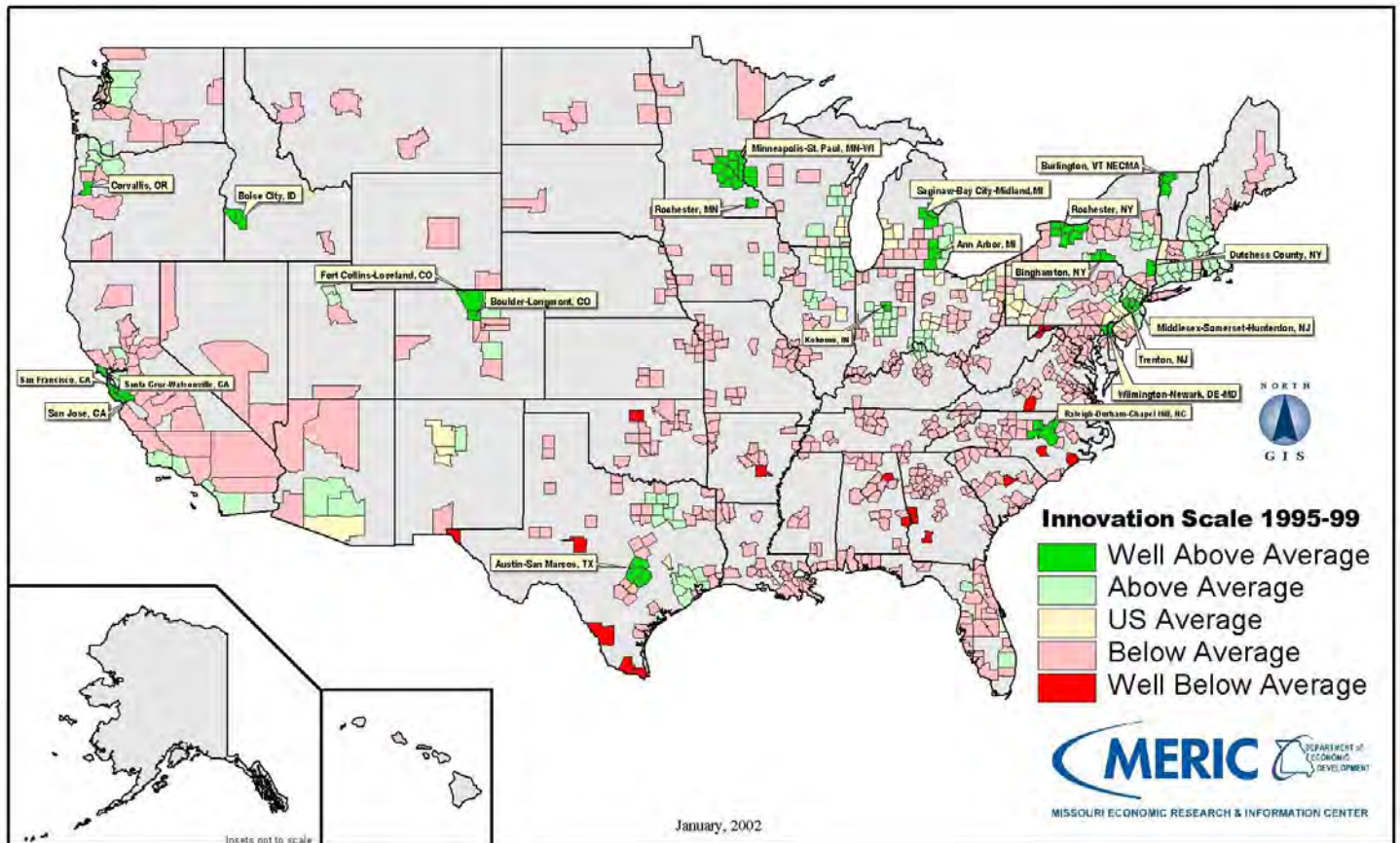| MISSOURI METROPOLITAN AREA	INNOVATION SCALE	PATENTS PER 100,000	PATENTS ISSUED
St. Louis, MO-IL MSA	-0.19	20.25	509
Columbia, MO MSA	-0.51	14.90	17
Springfield, MO MSA	-0.62	12.89	36
Joplin, MO MSA	-0.77	10.44	14
Kansas City, MO-KS MSA	-0.79	10.14	164
St. Joseph, MO MSA	-1.07	5.31	5
UNITED STATES METRO TOTAL	0.00	23.51	47,926

Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

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III. Innovation Clusters 1995-1999

In metropolitan areas of the United States between 1995 and 1999, 29.72 patents were issued per 100,000 population. Innovation clusters are those MSAs that have had a well above average (more than 1.0 standard deviation above the national mean) number of patents per 100,000 between 1995 and 1999.

The innovation clusters between 1995 and 1999 were San Jose CA (8.01), Boise City ID (4.41), Boulder-Longmont CO (4.20), Rochester NY (4.00), Rochester MN (3.73), Burlington VT (3.50), Dutchess County NY (3.18), Corvallis OR (2.74), Austin-San Marcos TX (2.73), Trenton NJ (2.73), Fort Collins-Loveland CO (2.05), Middlesex-Somerset-Hunterdon NJ (2.01), Santa Cruz-Watsonville CA (1.80), San Francisco CA (1.74), Wilmington-Newark DE-MD (1.72), Ann Arbor MI (1.56), Minneapolis-St. Paul MN-WI (1.27), Saginaw-Bay City-Midland MI (1.23), Raleigh-Durham-Chapel Hill NC (1.18), Binghampton NY (1.18) and Kokomo IN (1.01).

Map 3.1
Innovation Clusters, 1995-1999
Normed to the U.S. Metropolitan Average of 29.72 patents per 100,000 population

Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

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Table 3.1
Innovation Clusters by Metropolitan Area, 1995-1999

Average values for years 1995-1999

METROPOLITAN AREA	INNOVATION SCALE	PATENTS PER 100,000	PATENTS ISSUED
San Jose, CA PMSA	8.01	239.14	3,860
Boise City, ID MSA	4.41	144.94	557
Boulder-Longmont, CO PMSA	4.20	139.60	366
Rochester, NY MSA	4.00	134.35	1,455
Rochester, MN MSA	3.73	127.24	147
Burlington, VT NECMA	3.50	121.30	198
Dutchess County, NY PMSA	3.18	112.77	298
Corvallis, OR MSA	2.74	101.49	78
Austin-San Marcos, TX MSA	2.73	101.06	1,083
Trenton, NJ PMSA	2.73	101.05	334
Fort Collins-Loveland, CO MSA	2.05	83.41	189
Middlesex-Somerset-Hunterdon, NJ PMSA	2.01	82.37	909
Santa Cruz-Watsonville, CA PMSA	1.80	76.74	184
San Francisco, CA PMSA	1.74	75.27	1,255
Wilmington-Newark, DE-MD PMSA	1.72	74.80	418
Ann Arbor, MI PMSA	1.56	70.60	381
Minneapolis-St. Paul, MN-WI MSA	1.27	62.89	1,759
Saginaw-Bay City-Midland,MI MSA	1.23	61.85	249
Raleigh-Durham-Chapel Hill, NC MSA	1.18	60.68	637
Binghamton, NY MSA	1.18	60.68	153
Kokomo, IN MSA	1.01	56.13	56
Boston-Worcester-Lawrence-Lowell, MA PMSA	0.99	55.54	3,029
New Haven-Bridgeport-Stamford, CT PMSA	0.93	54.03	927
Albany-Schenectady-Troy, NY MSA	0.92	53.78	470
Madison, WI MSA	0.89	52.91	222
Oakland, CA PMSA	0.81	50.97	1,160
Appleton-Oshkosh-Neenah, WI MSA	0.81	50.88	174
San Diego, CA MSA	0.74	49.02	1,336
Santa Barbara-Santa Maria-Lompoc, CA MSA	0.73	48.89	189
Peoria-Pekin, IL MSA	0.69	47.67	165
Cedar Rapids, IA MSA	0.68	47.57	86
Orange County, CA PMSA	0.65	46.74	1,246
Newark, NJ PMSA	0.65	46.72	908
Hamilton-Middletown, OH PMSA	0.64	46.58	152
Greeley, CO PMSA	0.61	45.77	71
Yolo, CA PMSA	0.61	45.72	69
Seattle-Bellevue-Everett, WA PMSA	0.55	44.14	1,001
Santa Fe, NM MSA	0.54	43.83	61
Gainesville, FL MSA	0.52	43.39	86
Colorado Springs, CO MSA	0.50	42.75	206
Monmouth-Ocean, NJ PMSA	0.49	42.59	460
New London-Norwich, CT NECMA	0.48	42.33	121
Dallas, TX PMSA	0.46	41.84	1,305
Brazoria, TX PMSA	0.45	41.36	93
Cincinnati, OH-KY-IN PMSA	0.43	41.07	660
Portland-Vancouver, OR-WA PMSA	0.42	40.62	725
Lafayette, IN MSA	0.38	39.63	68
Ventura, CA PMSA	0.38	39.62	286
West Palm Beach-Boca Raton, FL MSA	0.36	39.15	397
Allentown-Bethlehem-Easton, PA MSA	0.36	39.12	240
UNITED STATES METRO TOTAL	**0.00**	**29.72**	**63,633**

Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

In Missouri, MSAs with the highest number of patents issued per 100,000 population were St. Louis MO-IL (25.15, ranking 93rd), Columbia MO (19.02, ranking 131st), Kansas City MO-KS (12.46, ranking 178th), Joplin MO (12.37, ranking 180th), Springfield MO (10.76, ranking 198th) and St. Joseph MO (7.82, ranking 242nd). There were 319 MSAs included in this analysis.

All of Missouri's MSAs had below average innovation scores, compared to the national average. In Missouri, MSAs with below average innovation scores were St. Louis MO-IL (-0.17), Columbia MO (-0.41), Kansas City MO-KS (-0.66), Joplin MO (-0.66), Springfield MO (-0.72) and St. Joseph MO (-0.84).

This indicates that Missouri's metropolitan areas were doing poorly in terms of innovation in the latter half of the 1990s.

Table 3.2
Innovations by Metropolitan Area in Missouri, 1995-1999
Average values for years 1995-1999

MISSOURI METROPOLITAN AREA	INNOVATION SCALE	PATENTS PER 100,000	PATENTS ISSUED
St. Louis, MO-IL MSA	-0.17	25.15	643
Columbia, MO MSA	-0.41	19.02	24
Kansas City, MO-KS MSA	-0.66	12.46	214
Joplin, MO MSA	-0.66	12.37	18
Springfield, MO MSA	-0.72	10.76	32
St. Joseph, MO MSA	-0.84	7.82	8
UNITED STATES METRO TOTAL	**0.00**	**29.72**	**63,633**

Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

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IV.   Innovation Growth Clusters 1990-1999

In metropolitan areas of the United States between 1990 and 1999, the number of patents issued per 100,000 population grew by 9.11 patents. Innovation growth clusters are those MSAs that have had well above average growth (more than 1.0 standard deviation above the national mean) in patents per 100,000 between 1990 and 1999.

The innovation growth clusters were San Jose CA (9.27), Boise City ID (6.35), Rochester MN (5.33), Burlington VT (5.32), Boulder-Longmont CO (3.88), Austin-San Marcos TX (3.22), Dutchess County NY (3.14), Santa Cruz-Watsonville CA (2.66), Corvallis OR (2.56), San Francisco CA (2.20), Fort Collins-Loveland CO (1.84), Raleigh-Durham-Chapel Hill NC (1.49), Yolo CA (1.38), Kokomo IN (1.32), Peoria-Pekin IL (1.23), Rochester NY (1.18), Colorado Springs CO (1.03) and Binghampton NY (1.01).

Map 4.1
Innovation Growth Clusters, 1990-1999
Normed to the U.S. Metropolitan Growth Average of 9.11 patents per 100,000 population
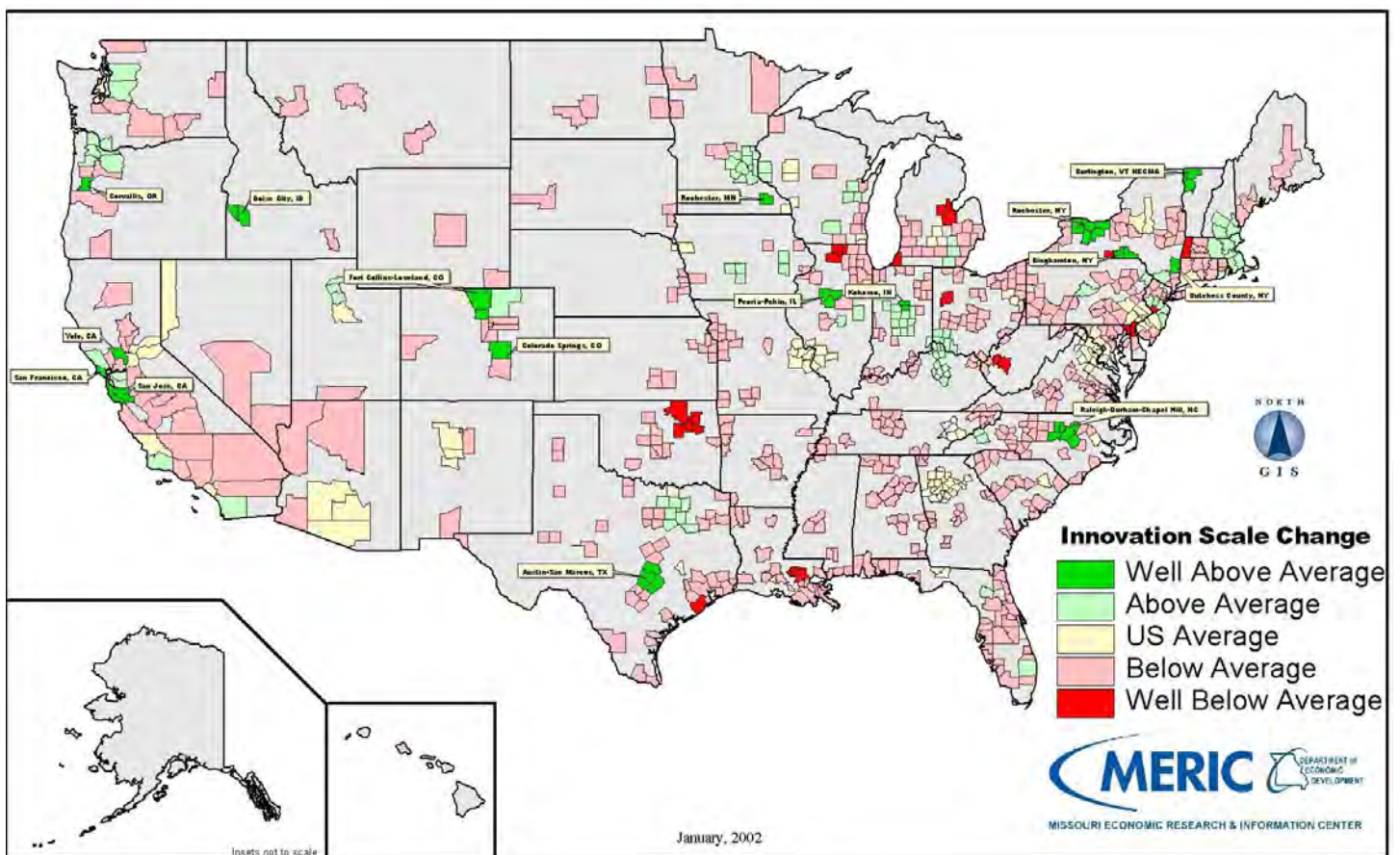
Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

Table 4.1
Innovation Growth by Metropolitan Area, 1990-1999
Average annual values for years 1990-1994 and 1995-1999

METROPOLITAN AREA	INNOVATION GROWTH SCALE	PATENTS PER 100,000 1990-1994	PATENTS PER 100,000 1995-1995
San Jose, CA PMSA	9.27	109.13	239.14
Boise City, ID MSA	6.35	53.86	144.94
Rochester, MN MSA	5.33	49.83	127.24
Burlington, VT MSA	5.32	44.06	121.30
Boulder-Longmont, CO PMSA	3.88	81.52	139.60
Austin-San Marcos, TX MSA	3.22	51.92	101.06
Dutchess County, NY PMSA	3.14	64.64	112.77
Santa Cruz-Watsonville, CA PMSA	2.66	35.03	76.74
Corvallis, OR MSA	2.56	61.13	101.49
San Francisco, CA PMSA	2.20	39.70	75.27
Fort Collins-Loveland, CO MSA	1.84	52.62	83.41
Raleigh-Durham-Chapel Hill, NC MSA	1.49	34.51	60.68
Yolo, CA PMSA	1.38	21.08	45.72
Kokomo, IN MSA	1.32	32.32	56.13
Peoria-Pekin, IL MSA	1.23	25.04	47.67
Rochester, NY MSA	1.18	112.37	134.35
Colorado Springs, CO MSA	1.03	22.72	42.75
Binghamton, NY MSA	1.01	40.96	60.68
Madison, WI MSA	0.95	34.07	52.91
Oakland, CA PMSA	0.92	32.54	50.97
Ann Arbor, MI PMSA	0.80	53.67	70.60
Portland-Vancouver, OR-WA PMSA	0.78	23.97	40.62
Greeley, CO PMSA	0.72	29.90	45.77
Seattle-Bellevue-Everett, WA PMSA	0.71	28.41	44.14
San Diego, CA MSA	0.71	33.34	49.02
Boston, MA-NH PMSA	0.68	40.30	55.54
Appleton-Oshkosh-Neenah, WI MSA	0.67	35.71	50.88
Santa Barbara-Santa Maria-Lompoc, CA MSA	0.64	34.19	48.89
Iowa City, IA MSA	0.60	21.62	35.82
Minneapolis-St. Paul, MN-WI MSA	0.57	49.00	62.89
State College, PA MSA	0.56	20.73	34.45
Lafayette, IN MSA	0.41	27.99	39.63
Hamilton-Middletown, OH PMSA	0.38	35.25	46.58
Dallas, TX PMSA	0.38	30.58	41.84
Indianapolis, IN MSA	0.37	23.61	34.71
West Palm Beach-Boca Raton, FL MSA	0.36	28.12	39.15
Middlesex-Somerset-Hunterdon, NJ PMSA	0.33	71.79	82.37
Des Moines, IA MSA	0.29	12.36	22.42
Salt Lake City-Ogden, UT MSA	0.27	24.23	34.07
Gainesville, FL MSA	0.26	33.78	43.39
Cedar Rapids, IA MSA	0.22	38.38	47.57
Santa Rosa, CA PMSA	0.21	17.30	26.29
Lexington, KY MSA	0.19	16.76	25.56
Cincinnati, OH-KY-IN PMSA	0.19	32.36	41.07
Monmouth-Ocean, NJ PMSA	0.18	33.94	42.59
Champaign-Urbana, IL MSA	0.17	19.50	28.01
New London-Norwich, CT-RI MSA	0.14	34.23	42.33
Newburgh, NY-PA PMSA	0.12	13.67	21.46
Decatur, IL MSA	0.12	10.40	18.17
Asheville, NC MSA	0.11	15.19	22.84
UNITED STATES METRO TOTAL	**0.00**	**23.51**	**29.72**

Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

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In Missouri, MSAs with the fastest growth in the number of patents issued per 100,000 population were St. Louis MO-IL (4.90, ranking 81st), Columbia MO (4.13, ranking 99th), St. Joseph MO (2.51, ranking 135th), Kansas City MO-KS (2.32, ranking 139th) and Joplin MO (1.94, ranking 157th). Springfield MO posted a decline in patents through the 1990s, with a loss of -2.12 patents per 100,000 population (ranking 287th). There were 319 MSAs included in this analysis.

All of Missouri's MSAs had below average innovation growth scores, compared to the national average. In Missouri, MSAs with below average innovation growth scores were St. Louis MO-IL (-0.10), Columbia MO (-0.16), St. Joseph MO (-0.28), Kansas City MO-KS (-0.29), Joplin MO (-0.32) and Springfield MO (-0.62).

This indicates that Missouri's metropolitan areas were doing poorly in terms of innovation growth all throughout the 1990s.

Table 4.2
Innovation Growth by Metropolitan Area in Missouri, 1990-1999
Average annual values for years 1990-1994 and 1995-1999

| MISSOURI METROPOLITAN AREA	INNOVATION GROWTH SCALE	PATENTS PER 100,000 1990-1994	PATENTS PER 100,000 1995-1999
St. Louis, MO-IL MSA	-0.10	20.25	25.15
Columbia, MO MSA	-0.16	14.90	19.02
St. Joseph, MO MSA	-0.28	5.31	7.82
Kansas City, MO-KS MSA	-0.29	10.14	12.46
Joplin, MO MSA	-0.32	10.44	12.37
Springfield, MO MSA	-0.62	12.89	10.76
UNITED STATES METRO TOTAL	0.00	23.51	29.72

Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

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V.   Innovation Clusters of the 1990s

Innovation is generally considered one of the key components of success in the New Economy. Throughout the decade of the 1990s, several key innovation clusters had emerged - growing in step with the New Economy. These clusters had well above average scores (more than 1.0 standard deviation above the mean) on all the innovation and growth measures all through the 1990s.

The innovation clusters for the decade of the 1990s (calculated by summing the innovation scales) were San Jose CA (22.31), Boise City ID (12.54), Boulder-Longmont CO (11.49), Rochester MN (10.60), Rochester NY (10.40), Burlington VT (10.03), Dutchess County NY (8.73), Austin-San Marcos TX (7.62), Corvallis OR (7.51), Fort Collins-Loveland CO (5.60) and Binghampton NY (3.21).

Map 5.1
Innovation Clusters of the 1990s
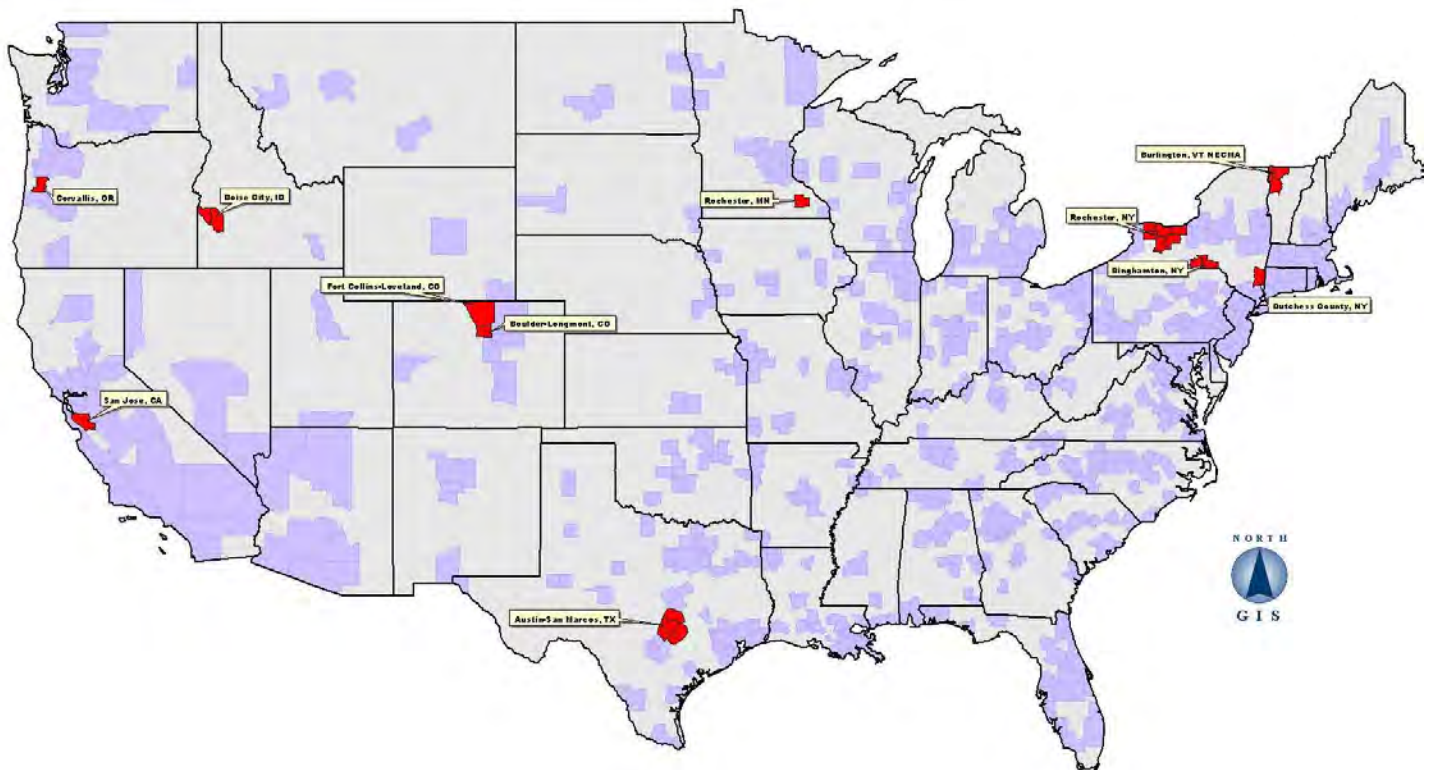
In addition, all but three of the innovation clusters had a Doctoral/Research Extensive or Intensive university or institution located within the MSA. This anecdotal evidence suggests there may be some link between innovation and research-intensive higher education at the national level.

Table 5.1
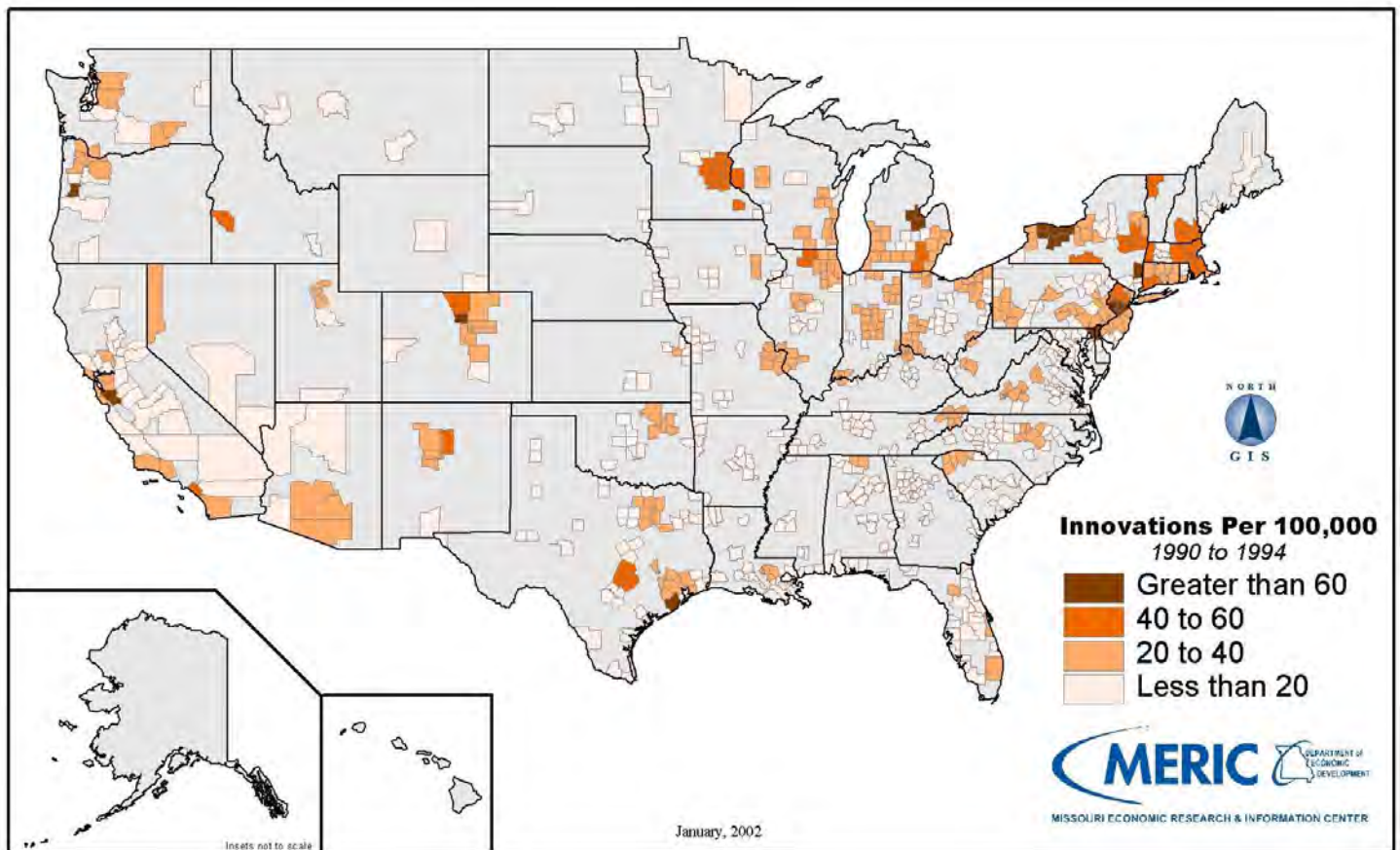**Innovation Clusters of the 1990s**
Ranked by summed innovation scales

METROPOLITAN AREA	INNOVATION SCALE 1990-1994	INNOVATION SCALE 1995-1999	INNOVATION GROWTH SCALE	DOCTORAL RESEARCH INST/UNIV
San Jose, CA PMSA	5.03	8.01	9.27	NONE
Boise City, ID MSA	1.78	4.41	6.35	NONE
Boulder-Longmont, CO PMSA	3.41	4.20	3.88	U. of Colorado
Rochester, MN MSA	1.54	3.73	5.33	Mayo Grad School
Rochester, NY MSA	5.22	4.00	1.18	U. of Rochester
Burlington, VT NECMA	1.21	3.50	5.32	U. of Vermont
Dutchess County, NY PMSA	2.41	3.18	3.14	NONE
Austin-San Marcos, TX MSA	1.67	2.73	3.22	U. of Texas-Austin
Corvallis, OR MSA	2.21	2.74	2.56	Oregon State U.
Fort Collins-Loveland, CO MSA	1.71	2.05	1.84	Colorado State U.
Binghamton, NY MSA	1.02	1.18	1.01	SUNY Binghampton

Sources: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.
Carnegie Classification of Institutions of Higher Education, 2000.

All of Missouri's MSAs have been doing poorly in terms of innovation throughout the decade of 1990s, compared to the nation as a whole. Given the fact that Missouri has a large number of quality Doctoral/Research universities (e.g. St. Louis University, University of Missouri System and Washington University) and an increasing number of high technology firms, many MSAs in the state should be able to capitalize on this knowledge base in the future to create innovation clusters in Missouri.

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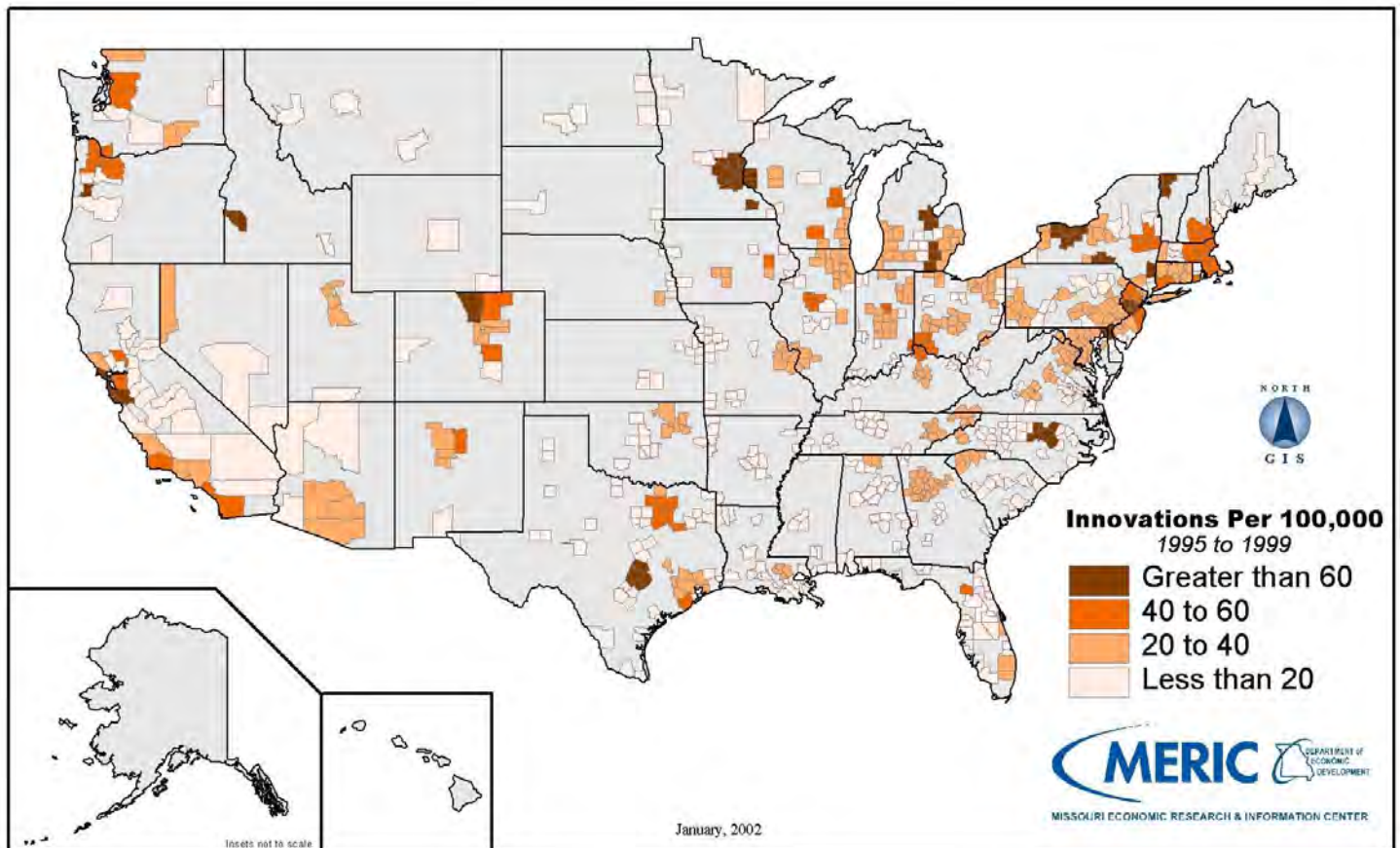
Appendix A - Patents Per 100,000 Population

Map A.1
Average Annual Number of Patents Issued Per 100,000 Population, 1990-1994
Average annual values for years 1990-1994
U.S. Metropolitan Average = 23.51 patents per 100,000 population

Innovations Per 100,000
1990 to 1994
Greater than 60
40 to 60
20 to 40
Less than 20

NORTH GIS

January, 2002

Insets not to scale

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Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

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Map A.2
Average Annual Number of Patents Issued Per 100,000 Population, 1995-1999
Average annual values for years 1995-1999
U.S. Metropolitan Average = 29.72 patents per 100,000 population

Innovations Per 100,000
1995 to 1999

- Greater than 60
- 40 to 60
- 20 to 40
- Less than 20

January, 2002

Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

Map A.3
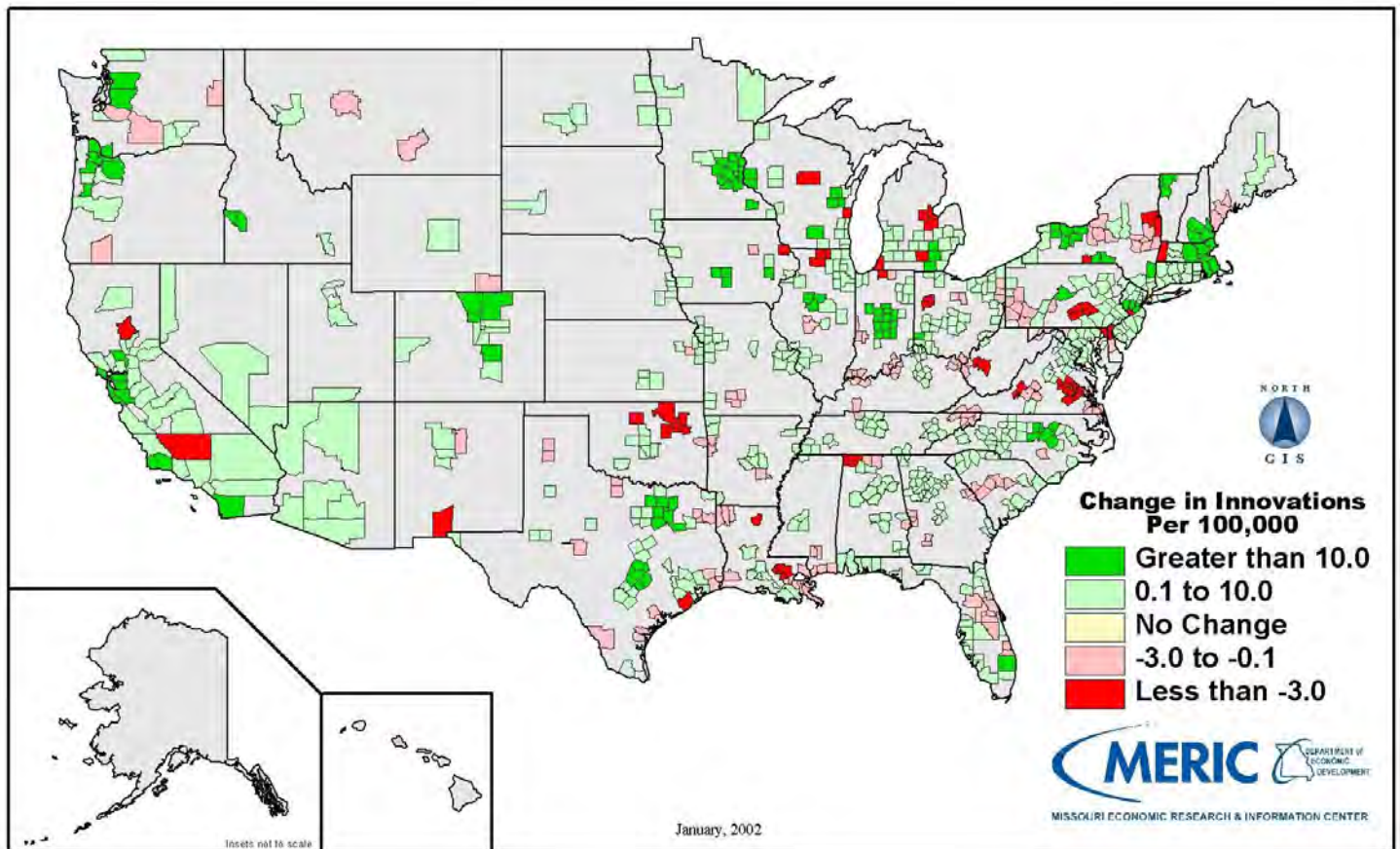**Change in Average Annual Number of Patents Issued Per 100,000 Population, 1990-1999**
Average annual values for years 1990-1994 and 1995-1999
U.S. Metropolitan Average = 9.11 patents per 100,000 population

Change in Innovations Per 100,000
- Greater than 10.0
- 0.1 to 10.0
- No Change
- -3.0 to -0.1
- Less than -3.0

January, 2002

Source: Analysis by MERIC using data from the U.S. Patent and Trademark Office, U.S. Department of Commerce.

Direct all correspondence to David J. Peters:

580 Harry S. Truman Building
Missouri Economic Research and Information Center
Missouri Department of Economic Development
Jefferson City, MO 65102

TEL: (573) 522-5721
FAX: (573) 751=7385
E-MAIL: dpeters4@mail.state.mo.us
WEB: http://www.MissouriEconomy.org